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RELATIONSHIP BETWEEN ECONOMIC VALUE ADDED (EVA) AND RETURN ON SALES (ROS): A STUDY IN TEHRAN STOCK EXCHANGE (TSE)

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ABSTRACT

Economic Value Added (EVA) is a financial performance evaluation method to compute the real economic revenue of a firm. This method can be used distinguish from the traditional accounting tools.

The main aim of this study is to investigate relationship Economic Value Added (EVA) and Return on sales (ROS) in listed companies of Tehran stock Exchange (TSE) during 2005-2009. The total numbers of companies listed in the Tehran Stock Exchange (TSE) are 337 over the period 2005-2009 and were selected randomly listed companies 180 of Tehran stock

Exchange (TSE). This study used two models of Calculation of EVA with WACC by Dividend Discount Model (DDM) and WACC by Capital asset pricing model (CAPM) that these named EVA with models 1 and 2.

The analysis of study Hypothesis illustrated that the relationship between EVA and ROS is significant and direct (positive) in both models 1 and 2. Coefficient of determination indicated that that can explain 15.6 % in model 1 and 20.3 % in model 2 of EVA changes with changes in the ROS.

Keywords: Economic Value Added (EVA), Return on sales (ROS), Tehran stock Exchange (TSE)

INTRODUCTION

Proponents of EVA provided evidence to establish this method as a superior performance measurement and incentive compensation system and claimed that it is really better to use EVA than traditional accounting performance measures such as earnings, EPS, ROI or ROE (Stewart, 1991; Tully 1993; Stern et al., 1995; Ehrbar, 1998). Many other scholars, such as Milunovich and Tseui (1996), Lehn and Makhija (1996; 1997), and Forker and Powell (2008) have published studies in support of the superiority of EVA.

EVA differs from the traditional accounting performance measures since it takes into account the cost of all capital employed. Although EVA is popularized as the only true indicator of business and management performance, it is in fact, one of the many variants of residual income (Maditinos, Željko Šević, & Theriou, 2006).

The empirical studies highlight that there is no single accounting measure which explains the variability in the shareholders wealth (Chen and Dodd, 1997). Any financial measures

used in assessing firm's performance must be highly correlated with shareholders wealth and on the other hand should not be subjected to randomness inherent in it. Traditional performance measures such as NOPAT, EPS, ROI, ROE etc. have been criticized due to their inability to incorporate full cost of capital thereby accounting income is not a consistent predictor of firm value and cannot be used for measuring corporate performance. Value based management system has gained popularity in academic literature in last two decades. One such innovation in the field of internal and external performance measurement is EVA (Sharma & kumar, 2010).

The main aim of this study is to investigate the relationship between Economic Value Added (EVA) and Traditional Accounting Measures as Return on sales (ROS) of Companies listed in Tehran stock Exchange (TSE).

NEED FOR THE STUDY

Financial performance refers to firm's ability to generate new resources from day to day operations over a given period of time. The financial performance measures can be divided into two major types:

(1). Traditional measures based on accounting/financial data (the effect of actions on one year's profits, ROS, ROE, etc.) which reflect a firm's past performance; and

(2). Economic Value Added (EVA) approach which is based on valuation principles and an advanced financial performance evaluation tool (Aktan & Bulut, 2008).

Traditional performance measures are unable to describe the company's true business results and sometimes lead to wrong business decisions. The EVA concept is easy to understand and easy to use. The managers can make it transparent to all employees in a

short time. Most of the managers still use Traditional methods for financial analysis of companies.

EVA is superior to accounting profits as a measure of value creation because it recognizes the cost of capital and, hence, the riskiness of a firm's operations (Chandra Shil, 2009).

The aim of this study is to investigate the relationship between Economic Value Added (EVA) and return on sales (ROS) of listed companies of Tehran Stock Exchange (TSE).

CONCEPT AND CALCULATION OF ECONOMIC VALUE ADDED (EVA)

Economic Value Added (EVA) is defined as the corporate operating profit after taxes (NOPAT), minus the cost of capital (Rappaport, 1986, 1998). EVA proponents assume that any increment in the firm EVA increases the company's value (Chen and Dodd, 1997).

In this study, EVA calculated as follows:

EVA =NOPAT _ (WACC × IC),

Where

_ NOPAT= Net Operating Profits After Taxes.

_ WACC=Weighted Average Cost of Capital

_ IC=Invested Capital

In this study NOPAT, IC, and WACC are calculated as follows:

NOPAT = EBIT × (1 – Tax Rate)

Where

_EBIT: earnings before interest and tax

Invested capital = Total assets – non-interest-bearing liabilities (NIBLs)

CALCULATING WEIGHTED AVERAGE COST OF CAPITAL (WACC)

The WACC is the minimum return that a firm must earn on existing invested capital. The WACC can be calculated by taking into account the proportionate weights of various funding sources such as common equity, straight debt, warrants and stock options, and multiplying them by the cost of each capital component (Lin and Huang, 2011).

Weight average capital of cost (WACC) =

(Interest expense / debt) × (debt / capital) × (1-tax %) +equity cost × (equity / capital)

$WACC = (k_e \times W_e) + (k_p \times W_p) + (k_d(pt)[1 – t] \times W_d)$

Where:

WACC = Weighted average cost of capital

k_e = Cost of common equity capital

W_e = Percentage of common equity in the capital structure, at market value

k_p = Cost of preferred equity

W_p = Percentage of preferred equity in the capital structure, at market value

$k_d(pt)$ = Cost of debt (pretax)

t = Tax rate

W_d = Percentage of debt in the capital structure, at market value

There are 2 ways to calculate K_e - namely:

i) DDM (if given level of dividend & rate of growth)

ii) CAPM (If given the rate of risk & return)

CONSTANT GROWTH VALUATION (gordon) MODEL OR DIVIDEND DISCOUNT MODEL (DDM)

The dividend discount model (DDM) is a way of valuing a company based on the theory that a stock is worth the discounted sum of all of its future dividend payments. In other words, it is used to value stocks based on the net present value of the future dividends. The equation most always used is called the Gordon growth model. It is named after Myron J. Gordon, who originally published it in 1959 (Investopedia, 2011).

The variables in this model are: P is the current stock price. g is the constant growth rate in perpetuity expected for the dividends. r is the constant cost of equity for that company. D_1 is the value of the next year's dividends (Wikipedia, 2012). There is no reason to use a calculation of next year's dividend using the current dividend and the growth rate, when management commonly disclose the future year's dividend and websites post it.

The Gordon model assumes that the value of a share of stock is equal to the present value of all future dividends (assumed to grow at the constant rate) over an infinite time horizon (gitman, 1998). The formula for the Gordon model is:

Cost of Equity = (Dividends per share / Price per share) + Dividend growth rate.

$K_e=D_1/P_0+G$

Where:

K_e =required return on common stock;

D_1= per-share dividend expected at the end of year 1;

P_0=value of common stock; and

G=constant rate of growth in dividends

This formula indicates that if the dividends expected at the end of the year 1 are divided by the current share price and then the expected growth rate is added.

In this study is used following formula for computing the expected growth rate (g):

g = ROE ×Retention ratio (RR)

Retention ratio: (1− DPS/ EPS)

g = ROE × (1− DPS/ EPS)

Where,

g: expected growth rate

ROE: Net income to equity ratio (Return on Equity)

CAPITAL ASSET PRICING MODEL (CAPM)

The cost of equity is the opportunity cost that investors require to compensate them for the variability of bottom- line profits (Stewart, 1991).

While this opportunity cost does not appear in any financial statements, stern Stewart approximates it, based on the capital asset pricing model (CAPM), by adding an individual company's adjusted risk premium of 6 % in the United States to the return on long-term government bonds. Ross et al. (2001) determined the average risk premium in South African for the period from 1925 to 1999 to be 9.8 % (Rm – Rf). The average return on the r 150 government bond was used as the risk –free rate (Rf).

In order to use the CAPM, the beta needed to be determined. Beta measure the risk in models of risk in finance. They measure the risk added to a diversified portfolio, rather than total market risk.

CAPM made some assumptions about the behavior of the investors. The most important is that investors are risk avoiders, and investors avoid the risks to diversify in other companies. CAPM is an expectation model, this model is based on the investors' expectation, what is going to happen, not based on what has happened (Young and O'Byrne, 2001). The formula is:

$K_e = R_f + \beta (R_m – R_f)$

Where,

K_e = Cost of equity

R_f = Risk-free rate, the amount obtained from investing in securities and considered free risk, such as government bonds from developed countries.

R_m = Rate of market return, calculated by summing returns in five year period (for this study)

β = Systematic risk (individual risk), calculated by searching the rate of beta's stock in five year period (for this study). Beta, it measures how much a company's stock price reacts against the market as a (Rm – Rf) = Equity Market Risk Premium, Equity Market Risk Premium (EMRP) represents the returns investors expected to compensate them for taking extra risk by investing in the stock market over and above the risk-free rate.

Table 1 displays risk-free rate (R_f) for five years (2005-2009) of the study:

Table 1 the risk-free rate in 2005 to 2009 periods

year	R_f 2005	R_f 2006	R_f 2007	R_f 2008	R_f 2009
Amount of the risk-free rate (R_f)	15.5 %	15.5 %	15.5 %	16 %	16 %

Based on table 2.1, the average of risk-free rate (R_f) for present study is 15.7 %.

The beta of a security can be found relative to the market return in the following way:

Beta = Covariance (stock versus market returns)/Variance of the market returns

In fact, to calculate a stock's beta it only needs two sets of data:

* Closing stock prices for the stock you're examining.

* Closing prices for the index these are choosing as a proxy for the stock market.

Table 2 indicates the market return (R_m) of Tehran Stock Exchange (TSE) for five years (2005-2009) of the study:

Table 2 the market return of Tehran Stock Exchange (TSE)

year	R_m 2005	R_m 2006	R_m 2007	R_m 2008	R_m 2009
Amount of the market return (R_m)	10259	10074	9737	9841	11207

CONCEPT OF RETURN ON SALES (ROS)

The return on sales (ROS) is a measure of the amount of profit that a dollar of sales generates. Projects that return higher profits per sales dollar are generally more favourable to the company than projects that have a lower profit per dollar of sales. The return on sales ratio tells us that some projects are relatively more profitable than others. If it is our wish to generate more profits, we should look for those projects that have higher ROS's (Adeak , 2010). ROS is calculated as:

Return on Sales (ROS) = Net Income /Net Sales

LITERATURE REVIEW

Makhija and Lehn (1997) investigated the relationship between several performance measures and stock returns. They used data from 452 US companies and the research period spanned from 1985 to 1994. The results of their study suggested that EVA and MVA,

like the traditional measures, are effective measures of performance. Moreover, even though not by a large difference, the correlation of EVA with stock returns (0.59) is greater than the correlation of MVA (0.58), ROE (0.46), ROA (0.46) or Return on Sales ROS (0.39) (p. 34-38).

McClenahen (1998) observed that "traditional corporate performance measures are being relegated to second-class status as metrics such as EVA become management's primary tools".

Turvey et al. (2000) studied the relationship between EVA and stock market returns for a sample of 17 publicly traded food companies in Canada. The key finding was that no relationship could be found between the two.

Günther, Landrock and Muche (2000) in examining the Germany stock market, could not prove that value-based measures (EVA, CVA, DCF and Tobin's Q) outperform traditional accounting-based measures (ROS, ROI, and ROE).

Garvey and Milbourn (2000) developed a model where they regressed the adopters and not adopters of EVA and the relevant variables. They emphasized the positive contribution of EVA to the value added and they also showed that the simple correlation between EVA and stock returns is a relevant factor in the choice of performance measures and it is a reliable guide as an incentive tool and measure for compensation.

Chen and Dodd (1996) in their study investigated the correlation between stock returns and EVA, residual income, ROA, ROE and EPS. This study was based on a sample of 566 U.S. firms during the period from 1983 to 1992. The results did not support the idea that EVA dominates earnings in relative information content.The adjusted EVA was found to offer some advantages over residual income or unadjusted EVA. The incremental tests also suggested that the components of EVA only add marginal information to earnings. The

results hence do not support the notion that EVA dominates earnings in relative information content.

OBJECTIVES OF THE STUDY

(1)- To introduce the concept of Economic Value Added (EVA).

(2)- To compute the Economic Value Added (EVA) of listed companies in Tehran stock Exchange (TSE) during 2005 to 2009 periods.

(3)- To calculate the Return on sales (ROS) of listed companies in Tehran stock Exchange (TSE) during 2005 to 2009 periods.

(4)- To investigate the relationship between Economic Value Added (EVA) and Return on sales (ROS) in Tehran stock Exchange (TSE).

RESEARCH HYPOTHESIS

Based on the results of prior empirical study, objective of the study and data availability; the following hypothesis has been developed for the study:

H_0: There is no significant relationship between Economic Value Added (EVA) and Return on Sale (ROS) of listed companies of Tehran Stock Exchange (TSE).

H_1: There is significant relationship between Economic Value Added (EVA) and Return on Sale (ROS) of listed companies of Tehran Stock Exchange (TSE).

RESEARCH METHODOLOGY

Sampling and analyzing

In this study, library method has been used for declaring theoretical discussions and filed methods for collecting the data related to Tehran stock Exchange (TSE).

The data used in this study is obtained from companies listed in Tehran stock Exchange (TSE).

Statistical Populations of research are 337 listed companies of TSE and based on Morgan and table, Researcher has selected randomly 180 listed companies of Tehran stock Exchange (TSE). In this study is utilized from 2 analyses of descriptive and Inferential Statistics.

For Inferential Statistics, liner regression model has been used to test the research statistical hypothesis at confidence level of 95%.

The regression model tested in this research and the description for each variable are as follow:

Ordinary regression is

$$EVA = \beta_0 + \beta\ ROS_{it} + \varepsilon$$

Standard regression is

$$EVA = \beta_0\ ROS_{it}$$

Where;

Y= EVA= Economic Value Added = dependent variable

X = ROS= Return on sales = independent variables

i=the number of company

t =time period

ε= Standard Error

β_0= Y-intercept =the point where the regression line crosses the Y-axis

RESEARCH VARIABLES

In this study, Economic Value Added (EVA) is as Dependent Variable and Return on sales (ROS) is as independent variable.

Calculation of EVA with WACC by Dividend Discount Model (DDM) is named EVA with model 1, and also EVA with WACC by Capital asset pricing model (CAPM) is named EVA with model 2.

DESCRIPTIVE STATISTICS OF THE RESEARCH

According figure 1, EVA of listed companies of TSE in 2005, 2006, 2007, 2008, and 2009 are 52109,-10826, -12789, 14329, and -77477. The average of EVA during 2005 to 2009 in models 1 and 2 are obtained -6931 and 80035.

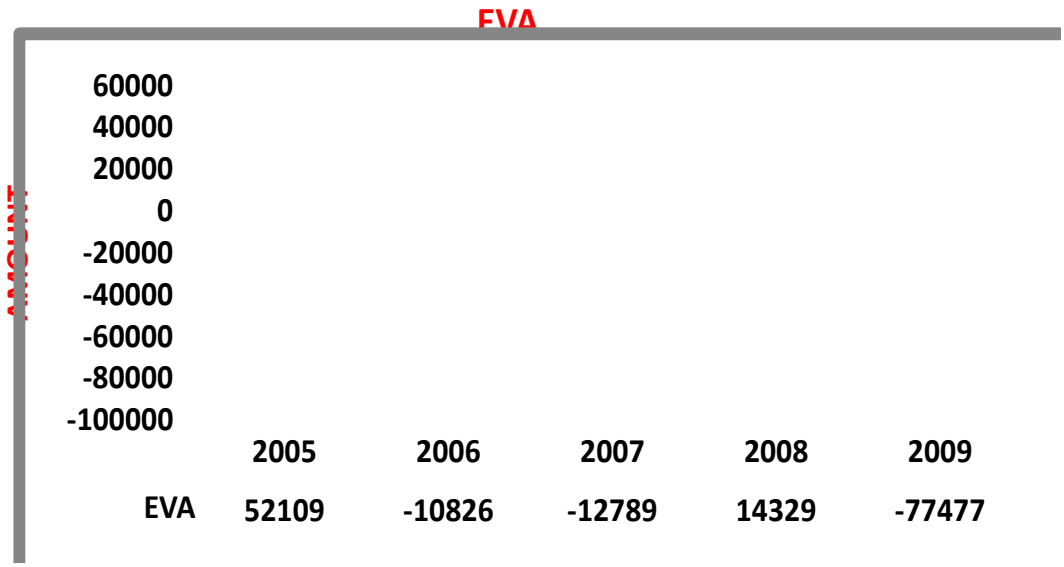

Figure 1 EVA of listed companies of TSE in 2005-2009 periods (model 1)

Based on Figure 2, ROS of listed companies of TSE in 2005, 2006, 2007, 2008, and 2009 are 0.48, 0.31, 0.27, 0.29, and 0.24.

Figure 2 ROS of listed companies of TSE in 2005-2009 periods

INFERENTIAL STATISTICS OF THE RESEARCH

Analysis with model 1: According to Table 3, the result of liner regression states Sig = 0.000 which is smaller than 5 percent. Thus, the null hypothesis of Hypothesis of the study is rejected and there is significant relationship between Economic Value Added (EVA) and Return on Sale (ROS) of listed companies of Tehran Stock Exchange (TSE).

Table 3 significant relationship between EVA and ROS in model 1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.931	1	14.931	32.932	.000[a]
	Residual	80.702	178	.453		
	Total	95.633	179			

a. Predictors: (Constant), ROS

b. Dependent Variable: EVA

As shown in table 4, the coefficient of determination is 0.156; and the Durbin-Watson = 1.885, which is between the two critical values of $1.5 < d < 2.5$ and therefore it can assume that there is no first order linear auto-correlation in the hypothesis of the study of study.

Table 4 Model Summary of the relationship between EVA and ROS in model 1

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.395[a]	.156	.151	.6733362	1.885

a. Predictors: (Constant), ROS

b. Dependent Variable: EVA

According to Table 5, the liner regression models tested for Hypothesis of the study will be as follow:

Ordinary regression is

$$EVA = 4.684 + 0.704\ ROS\ 180,\ 2005\text{-}2009 + 0.101\ \varepsilon\ 180,\ 2005\text{-}2009$$

Standardized regression is

$$EVA = 0.395\ ROS\ 180,\ 2005\text{-}2009$$

Table 5 Unstandardized and Standardized Coefficients and significant relationship between EVA and ROS in model 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.684	.101		46.409	.000
	ROS	.704	.123	.395	5.739	.000

a. Dependent Variable: EVA

The figure 3 shows the above results and exhibits the relationship between two variables of dependent (EVA) and independent (ROS), coefficient of determination and ordinary regression formula.

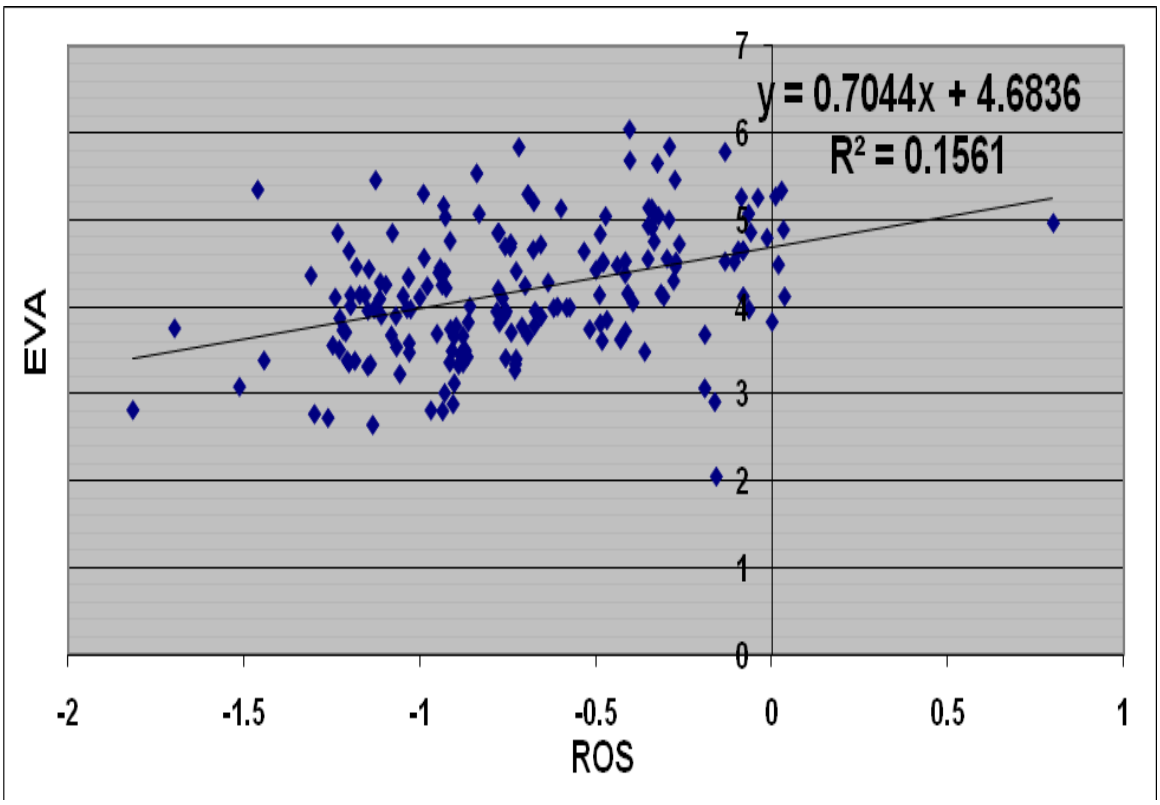

Figure 3 the relationship between EVA and ROS in model 1

Analysis with model 2: As shown in table 6, the result of liner regression shows Sig = 0.000 which is smaller than 5 percent. Thus, the null hypothesis of research Hypothesis is rejected and there is significant relationship between Economic Value Added (EVA) and Return on Sale (ROS) of listed companies of Tehran Stock Exchange (TSE).

Table 6 significant relationship between EVA and ROS in model 2

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.471	1	22.471	45.363	.000[a]
	Residual	88.174	178	.495		
	Total	110.645	179			

a. Predictors: (Constant), ROS

b. Dependent Variable: EVA

As shown in table 7, the coefficient of determination is 0.203; and the Durbin-Watson = 1.827, which is between the two critical values of $1.5 < d < 2.5$ and therefore it can assume that there is no first order linear auto-correlation in the hypothesis of study.

Table 7 Model Summary of the relationship between EVA and ROS in model 2

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.451[a]	.203	.199	.7038179	1.827

a. Predictors: (Constant), ROS

b. Dependent Variable: EVA

According to Table 8, the liner regression models tested for hypothesis of the study will be as follow:

Ordinary regression is

EVA = 4.898 + 0864 ROS 180, 2005-2009 + 0.105 ε 180, 2005-2009

Standardized regression is

EVA = 0.451 ROS 180, 2005-2009

Table 8 Unstandardized and Standardized Coefficients and significant relationship between EVA and ROS in model 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.898	.105		46.432	.000
	ROS	.864	.128	.451	6.735	.000

a. Dependent Variable: EVA

The figure 4 indicates the above results and clearly shows the relationship between two variables of dependent (EVA) and independent (ROS), coefficient of determination and ordinary regression formula.

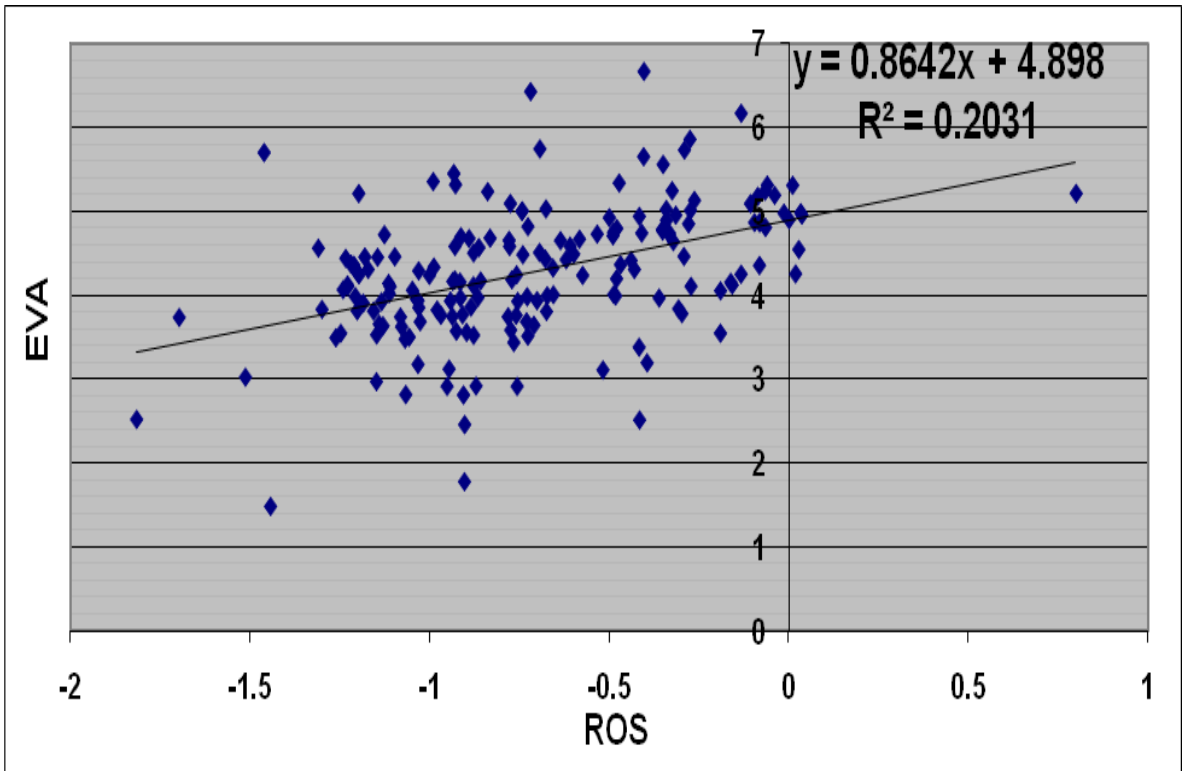

Figure 4 the relationship between EVA and ROS in model 2

FINDINGS AND CONCLUSION OF STUDY

The analysis of research hypothesis and correlation coefficient (Beta) showed that the relationship between EVA and ROS is significant and direct (positive) in both models 1 and 2 (Beta in models 1 and 2 = 0.395 & 0.451).

The results indicate that in model 1, whenever ROS during 2005 to 2009 is reduced or increased (ROS 2005 to 2009 = 0.48, 0.31, 0.27, 0.29, and 0.24) as EVA decreased and increased (EVA 2005 to 2009=52109, -10826, -12789, 14329, and -77477).

Coefficient of determination in both models indicated that relationship between EVA and ROS is almost useful in both models 1 and 2 (R^2 model 1= 0.156 & R^2 model 2=0.203). Based on these results, about 15.6 % in model 1 and 20.3 % in model 2 of the variation in the EVA is explained by ROS.

The analysis result of research hypothesis is in line with the study by Lehn and Makhija (1997). Correlation confident of between EVA and ROS in study of Lehn and Makhija (1997) was 0.39 that is almost equal with present study (0.395 and 0.449 in models 1 and 2).

CONCLUSION

Main purpose of any firm is to increase the value of firm and EVA measures value creation for shareholders and investors and integrates the impacts of profitability and growth into the same measure. EVA as a strategy formulation and financial performance management tool helps corporation to make greater than their cost of capital.

This study illustrated that EVA is unique and distinct from traditional accounting ratio as ROS. The Coefficient of determination between EVA and ROS proved that ROS is a predictor almost weak for value estimation.

Thus, EVA is suitable for use as a measure of annual performance, related to executive pay, unlike some traditional measures. Positive EVA implies that the creation of shareholder value and can be used to reward managers accordingly.

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